

CLAIMS (IN AMENDED FORM)

1. (Presently Amended) A method of assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said target with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

subjecting said target-probe complex to an applied magnetic field so as to induce magnetization; and

determining one or more magnetic characteristics by measuring and characterizing a magnetic signal of said target-probe complex induced by said applied magnetic field in any one or more of (1) time response, called magnetic swing time, (2) spatial orientation, and (3) hysteresis loop as is solvable for (3a) saturation magnetization, (3b) remnant magnetization and, (3c) coercive force ~~as well as~~ and (4) magnitude so as to, by action of the determining, identify ~~some one or more~~ any of the presence, location, orientation and quantity of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

2. (Original) The method of claim 1, wherein said target molecule or molecular complex is disposed on a support.

3. (Previously Amended) The method of claim 2, wherein said target molecule or molecular complex is disposed on the support in an array.

4. (Previously Amended) The method of claim 3, wherein said array is an addressable array.

5. (Original) The method of claim 1, wherein said probe is disposed on a support.

6. (Previously Amended) The method of claim 5, wherein said probe is disposed on the support in an array.

7. (Original) The method of claim 6, wherein said array is an addressable array.

8. (Previously Amended) The method of claim 1, wherein said determining comprises:

measuring and characterizing the magnitude of the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

9. (Previously Amended) The method of claim 1, wherein said determining comprises:

providing a magnetic sensor; and
generating a signal with the magnetic sensor in response to said one or more magnetic characteristics.

10. (Previously Amended) The method of claim 9, wherein said generating a signal with the magnetic sensor uses a giant magnetoresistive ratio sensor.

11. (Previously Amended) The method of claim 9, wherein said determining comprises:

providing a signal processing means that generates readable output from said signal.

12. (Presently Amended) The method of claim 9
wherein said target molecule or molecular complex is disposed on a support;

and wherein said determining comprises:

moving the support and the sensor one in relation to each other in one or more directions.

13. (Previously Amended) The method of claim 1, further comprising:

subjecting said target-probe complex to one or more of a plurality of applied magnetic fields having different intensities.

14. (Previously Amended) The method of claim 1, further comprising:

subjecting said target-probe complex to one or more of a plurality of applied magnetic fields having different directions.

15. (Presently Amended) The method of claim 1, further comprising:

contacting the target molecule of molecular complex with a non-magnetic colloid so as to block the magnetic signal from the molecular complex.

16. (Previously Amended) The method of claim 1, further comprising:

joining the probe to one or more colored beads, fluorescent beads, or fluorescent cells.

17. (Original) The method of claim 1, further comprising the step of detecting the presence of said target probe complex by visual, electronic or optical means.

103. (Previously Added) The method of claim 1, wherein said determining comprises:

measuring and characterizing a time response, called the magnetic swing time, of the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

104. (Previously Added) The method of claim 1, wherein said determining comprises:

measuring and characterizing a spatial orientation of the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

105. (Previously Added) The method of claim 1, wherein said determining comprises:

measuring and characterizing the hysteresis loop exhibited by the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

106. (Previously Amended) The method of claim 105 wherein measuring and characterizing of the hysteresis loop also measures and characterizes the saturation of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex.

107. (Previously Amended) The method of claim 105 wherein measuring and characterizing of the hysteresis loop also measures and characterizes the saturation magnetization of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex.

108. (Previously Amended) The method of claim 105 wherein measuring and characterizing of the hysteresis loop also measures and characterizes the remnant magnetization of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex,

109. (Previously Amended) The method of claim 105 wherein measuring and characterizing of the hysteresis loop also measures and characterizes the coercive force of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex.

110. (Previously Added) The method of claim 1, further comprising:

subjecting said target-probe complex to one or more of a plurality of applied electric fields having different intensities.

111. (Previously Added) The method of claim 1, further comprising:

subjecting said target-probe complex to one or more of a plurality of applied electric fields having different directions.

112. (Previously Added) The method of claim 1 wherein the contacting of said target is with one or more probes containing a ferromagnetic material as the magnetic label.

113. (Presently Amended) The method of claim 1 wherein the contacting of said target is with one or more probes containing a ferrimagnetic material as the magnetic label.

114. (Previously Added) The method of claim 1 wherein the contacting of said target is with one or more probes containing a paramagnetic material as the magnetic label.

115. (Previously Added) The method of claim 1 wherein the contacting of said target is with one or more probes containing a superparamagnetic material as the magnetic label.

116. (Presently Amended) A method of assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said target with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

subjecting said target-probe complex to an applied magnetic field so as to induce magnetization; and

determining one or more magnetic characteristics by measuring and characterizing a magnetic signal of said target-probe complex induced by said applied magnetic field in any one or more of (1) time response, called magnetic swing time, (2) spatial orientation, and (3) hysteresis loop as is solvable for (3a) saturation magnetization, (3b) remnant magnetization and

(3c) coercive force[;] and (4) magnitude, so as to, by action of the determining, identify the presence, location, orientation and quantity of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.